

For the owner and the heating engineer



Operating and Installation Manual VRC 400



Programmable weather compensator with separat HW time control

GB

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Notes on the documentation

The following information is intended to help you throughout the entire documentation. Further documents apply in combination with this installation and operation manual.

We accept no liability for any damage caused by failure to observe these instructions.

Symbols used

Please observe the safety instructions in this manual for the installation of the control.



Danger

Immediate risk of serious injury or death

- Symbol for a necessary task

Storage of the documents

Please pass on this operating and installation manual to the owner of the system so that he can keep it available whenever it is required.

Safety

The weather compensator must be installed by a qualified engineer, who is responsible for adhering to the existing standards and regulations.

We accept no liability for any damage caused by failure to observe these instructions.

Operating manual

1 Control overview

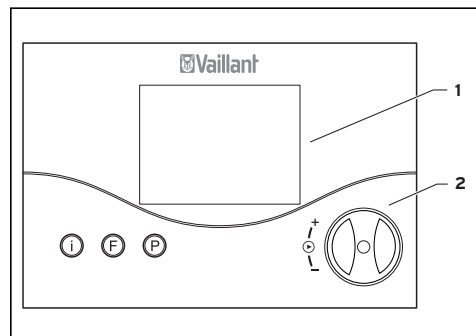


Fig. 1.1 Control overview

Key

- 1 Display
- 2 Dial (turn and click)
- I Info button
- F Special functions button
- P Programming button/installer level

2 Display overview

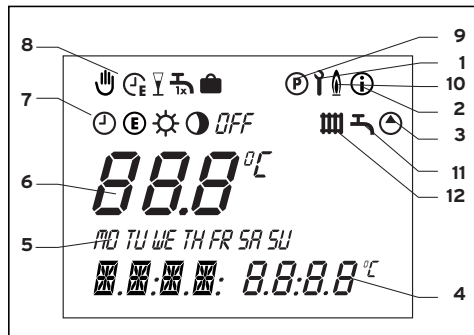


Fig. 2.1 Overview of display

Key

- 1 Installer level and service/diagnosis level (see 11.1)
- 2 Info level (see 4.7)
- 3 Circulation pump symbol
- 4 Time/temperature display
- 5 Days of the week
- 6 Actual temperature
- 7 Operating modes (see 4.1)
- 8 Special functions (see 4.6)
- 9 Setting timer programmes (see 4.3)
- 10 Boiler operation indicator
- 11 Hot water symbol
- 12 Heating circuit symbol

3 Description of the control

The VRC 400 is a weather compensator with a weekly programme for heating, hot water and a circulation pump for connecting to Vaillant boilers with an eBus.

The VRC 400 enables you to set heating programmes depending on the outside temperature. In addition, you can select special functions such as the party function, and control the timed operation of hot water and a separate circulation pump.

4 Operation

The operating principle uses three buttons and a dial (Vaillant “Turn and Click” operating concept).

The display normally shows the current operating mode (e.g. ☉ ☼), or, if activated, the special function and the current room temperature, the day of the week, the time and the symbol for heating, hot water and/or the circulation pump, depending on which is requested.

4.1 Setting the operating modes

Table 4.1 contains an overview of the operating modes you can select.

The selected operating mode affects the timer programmes both for heating and for hot water and the circulation pump.

- When the weather compensator is in normal display mode, press the dial once – the symbol for the selected mode flashes in the display.
- Turn the dial until the display shows the operating mode you want.

The display switches back to normal mode after five seconds.

4 Operation

Symbol	Meaning Heating	Meaning Hot water/circulation pump
	Automatic: According to the timer programmes set in the weather compensator, the heating circuit switches between heating mode ☼ and set-back mode ◐. The heating circuit symbol is displayed if a heating requirement is detected.	The hot water cylinder/circulation pump mode switches between heating ON and OFF according to the timer programme set on the controller. The hot water symbol and the circulation pump symbol are shown when the time window is active. If there is a hot water request, the hot water symbol flashes.
	Heating: The heating circuit is operated according to the room temperature, regardless of the programme set on the controller. The heating circuit symbol is displayed if a heating requirement is detected.	
	Set-back: The heating circuit is operated according to the set-back temperature "ECO", regardless of the programme set on the controller. The heating circuit symbol is displayed if a heating requirement is detected.	

Symbol	Meaning Heating	Meaning Hot water/circulation pump
	ECO: According to the setted timer programmes, the heating circuit switches between heating mode  and OFF. The heating circuit is switched off in set-back mode, provided the anti-frost function (activated when the outside temperature is below 3 °C) is not active. The heating circuit symbol is displayed if a heating requirement is detected or the anti-frost function is active.	See the table on the left
<i>OFF</i>	Off: The heating circuit is off, provided that the frost protection function (if the outside temperature is below 3 °C) is not activated. If the frost protection function is activated, the heating circuit symbol is displayed.	The boiler is not heated up, regardless of the set timer programme. The circulation pump is switched off. The hot water and circulation pump symbols are not displayed.

Table 4.1 Operating modes

4 Operation

4.2 Setting the current day and time

To set the current day and time with the display in normal mode, you must perform the following steps:

- Press the dial until a day of the week starts flashing.
- Turn the dial until you see the current day of the week.

MO = Monday

TU = Tuesday

WE = Wednesday

TH = Thursday

FR = Friday

SA = Saturday

SU = Sunday

- Press the dial. The hours start flashing.
- Turn the dial until you see the current hour.
- Press the dial. The minutes start flashing.
- Turn the dial until you see the current minute.

The display switches back to normal mode after five seconds.

If the calendar is activated on the installer level (see 11.1), you can set the day, month and year in the same way.

This allows automatic switching from winter to summer time.

4.3 Setting timer programmes

The controller is equipped with a basic program (Table 4.2).

Time window	Day/Block of days	Start time	End time
H1	MO-FR	6:00	22:00
H2	-	-	-
H3	-	-	-
H1	SA	7:30	23:30
H2	-	-	-
H3	-	-	-
H1	SU	7:30	22:00
H2	-	-	-
H3	-	-	-

Table 4.2 Default heating, hot water and circulation programmes

You can adapt the default programmes to suit your needs. There are six steps to setting the times you want:

1. Press the programming button P
2. Select the timer programme (heating, hot water or circulation pump)
3. Select the time window
4. Select the day or block of days
5. Set the start time
6. Set the end time

You can define three time windows for each day.

When you press the P button the display returns to basic mode.

4 Operation

The table below illustrates the individual steps again, using the example of the hot water timer programme.

If you want to change the timer programme for heating or the circulation pump, after pressing the programming button P, select the corresponding symbol (heating circuit or circulation pump) and continue as shown in the example.

Display	Required steps
	Press the programming button P. The cursor (black triangle) marks the value which can be changed (H1), which also flashes. Turn the dial until you see the hot water symbol.
	Press the dial. The cursor marks the adjustable value (H1), which also flashes. Select the time window by turning the dial. Settings: H1, H2, H3

Display	Required steps
	Press the dial. The cursor marks the days of week display, which also flashes. Select a block of days or a single day of the week by turning the dial. Settings: MO - SU MO - FR SA - SU MO = Monday TU = Tuesday WE = Wednesday TH = Thursday FR = Friday SA = Saturday SU = Sunday

Display	Required steps
	Press the dial. The cursor marks the start time and the hour display flashes. Select the start time by turning the dial. Press the dial again to set the minutes.
	Press the dial. The cursor marks the end time and the hour display flashes. Select the end time by turning the dial. Click the dial again to set the minutes.

Table 4.3 Setting time windows

4 Operation

If necessary, you can switch the weather compensator from the week programme to a daily programme.

- With the display in normal mode, press the F button for 10 seconds.

When you programme time windows, days of the week will no longer be displayed.

4.4 Setting the room temperature

If the controller is installed in the boiler, the basic display shows the set room temperature, from which the required flow temperature for the set heating curve is calculated.

You can set the room temperature directly from the basic display. If the temperature level function is activated on the installer level (setting different temperatures for each time window, see 11.1), the display shows the currently set - room temperature (T-H1, T-H2, T-H3).

If the controller is installed outside the boiler in a wall mounting box, the basic display shows the room temperature currently measured.

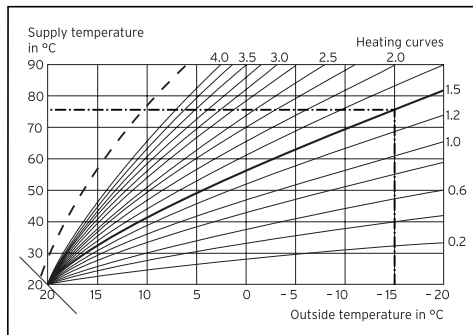


Fig. 4.1 Set room temperature diagram

The diagram in fig. 4.1 shows you the relationship between the set room temperature and the heating curve. If you increase the set room temperature, you

move the set heating curve parallel on a 45° axis and the flow temperature calculated by the weather compensator.

Setting the required room temperature directly

- Turn the dial (with the display in normal mode).

The current temperature display disappears, the sun symbol is displayed on the mode level and the required room temperature is shown (e. g. TEMP 20.0 °C).

- By turning the dial you can set the required room temperature directly (after 1 second).

4 Operation

The display switches back to normal mode after five seconds.

Setting the room temperature for time windows

(Only possible if the temperature level function is set on the installer level, see 11.1). In this case you can set different room temperatures for each time window.

- Press the dial several times until T-H1 appears in the display along with a set value. The set value flashes.
- Turn the dial until you see the room temperature you want for the time window H1. The new room temperature is assigned to all time windows with H1.

- Press the dial. T-H2 is displayed along with a set value.
The set value flashes.
- Turn the dial until you see the room temperature you want for the time window H2.
The new room temperature is assigned to all time windows with H2.
- Press the dial. T-H3 is displayed along with a set value.
The set value flashes.
- Turn the dial until you see the room temperature you want for the time window H3.
The new room temperature is assigned to all time windows with H3.

The display switches back to normal mode after five seconds.

Setting the set-back temperature "ECO"

- Press the dial several times until ECO appears in the display. The set-back temperature is displayed and starts flashing.
- Turn the dial until the required set-back temperature is displayed (e.g. ECO 15.0 °C).

The display switches back to normal mode after five seconds.

4.5 Setting the hot water temperature

You can set the hot water temperature from the basic display.

Please note the set maximum hot water temperature on the boiler.

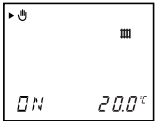
- Press the dial several times until DHW appears in the display. The set value flashes.
- Turn the dial until the required hot water temperature is displayed (e.g. DHW 60 °C).

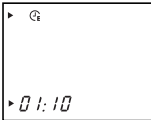
The display switches back to normal mode after five seconds.

4 Operation

4.6 Activating special functions

Press the F button to access the special functions. You can activate the following functions:

Display	Required steps
	Quick veto The quick veto function allows you to adjust the room temperature for a short time (until the next time window). Press the special function button F once. The quick veto symbol appears in the display along with the quick veto room temperature, which flashes. Turn the dial until the quick veto temperature you want is displayed. After 10 seconds, the display returns to normal mode and the function is activated. To deactivate the function early, just press the F button.

Display	Required steps
	Energy-Saving function The energy-saving function lets you lower the heating for an adjustable period regardless of the set heating programme. Press the special function button twice and the energy-saving symbol appears on the display. You will also see the time flashing. Now turn the dial to set the end time up to which the heating is operated in set-back mode. The display switches back to basic mode after 10 seconds and the function is activated. To deactivate the function early, just press the F button.

Display	Required steps
 	Party function When you activate the party function the heating phase is continued beyond the next set-back phase. This also applies to the hot water and circulation pump programmes. Press the special function button F three times. The party symbol appears in the display and the function is activated after ten seconds. The function is deactivated automatically on reaching the next heating phase. If you want to deactivate the function before, just press the F button. The function can be activated only in "Auto" mode  or "Eco"  mode.

Display	Required steps
 	One-time recharging/ Cylinder Boost This function allows you to fill the cylinder, regardless of the set timer programme. Press the special function button four times. The once-only cylinder filling symbol appears in the display and the function is activated after ten seconds. If you want to deactivate the function early, just press the F button.

Display	Required steps
	Holiday function The holiday function deactivates the weather compensator, but not the frost protection function. The hot water and circulation pump are also deactivated. Press the special function button F five times - the holiday function symbol flashes in the display. The set value for the number of days' holiday also flashes. Turn the dial until the required number of day's holiday appears. After 10 seconds the function is activated and the mode is set to OFF for the selected period (see 4.1). If you want to deactivate the function before, just press the F button. If the anti-legionnaire's disease function is activated, it is performed on the last day of the holiday.

Table 4.4 Special functions

4.7 Info level

Press the info button to access the info level. The info symbol appears in the display as soon as you open the info level. Each time you press the info button, different information is displayed:

- The name of the weather compensator (VRC 400)
- The quick veto room temperature (if active)
- The set room temperature T-H1 (if activated - e.g. T-H1 20.0 °C)
- The set room temperature T-H2 (if activated - e.g. T-H2 23.0 °C)
- The set room temperature T-H3 (if activated - e.g. T-H3 20.0 °C)

- The set room temperature if the temperature level function is not activated (e.g.. TEMP 21.5 °C)
- The current set-back temperature (e.g. ECO 15.0 °C)
- The set hot water temperature (e.g. DHW 60 °C)
- The day/month/year (if the calendar is activated)
- Timer programmes set for heating (every single time window per day)
- Timer programmes set for hot water (every single time window per day)
- Timer programmes set for the circulation pump (every single time window per day)

5 Vaillant warranty

We only grant a Vaillant manufacturer's warranty if a suitably qualified engineer has installed the system in accordance with Vaillant instructions.

The system owner will be granted a warranty in accordance with the Vaillant terms and conditions. All requests for work during the guarantee period must be made to Vaillant service (0870 6060 777).

6 Recycling and disposal

Neither the weather compensator or any of its accessories belong in the household waste. Make sure the old control and any accessories are disposed of properly.

Installation manual

7 Information on installation and operation

The assembly, electrical connection, control settings and commissioning may only be carried out by an approved company specialising in heating engineering.

7.1 CE label

The CE label shows that the VRC 400 weather compensator, when connected to Vaillant boilers, meets the basic requirements of the Council of Europe's directive 89/336/EEC on electromagnet-

ic compatibility and the low voltage directive 73/23/EEC.

7.2 Intended use

The VRC 400 weather compensator is a state-of-the-art control which has been constructed in accordance with recognised safety regulations. Nevertheless, there is a risk of death or serious injury to the user or others, and the control or other property may be damaged in the event of improper use or use for which it is not intended.

The VRC 400 weather compensator is designed to control a heating system with a heating circuit with or without a

hot water system or circulation pump according to weather conditions, time and location, in connection with a Vailant boiler with an eBUS.

Any other use or extended use is considered to be improper. The manufacturer or supplier is not liable for any resulting damage.

The user alone bears any risk. Intended use includes the observance of the operating and installation manual.

8 Safety instructions and regulations

The control must be installed by an approved company specialised in heating engineering, which is responsible for compliance with applicable standards and regulations. We accept no liability for any damage caused by failure to observe these instructions.

8.1 Safety instructions



Danger!

Risk of fatal electric shock from touching live connections.

Before working on the control, switch off the power supply and prevent it from being switched on again.

Only remove the controller from its wall mounting or base when it is not live.

8.2 Regulations

All wiring must be in accordance with Building Regulations Part P, current IEE regulations, and all other relevant regulations and guidelines, and must be carried out by a suitably qualified person.

Use standard commercial cables for the wiring.

- Minimum cross-section of wires:
0.75 mm²

Do not exceed following maximum wire lengths:

- Bus wires: 300 m

Connections with 230 V and bus wires must be laid separately if longer than 10 m.

The controller may only be installed in dry rooms.

9 Installation

The weather compensator can be alternately integrated in the boiler or e.g. can be installed on the wall in the living area with the wall socket provided with the control. It is connected to the boiler merely with a 2-core connection cable.

9.1 Control installation

To install the weather compensator directly in the front screen of the boiler, you only need to remove the front

screen and to push the controller into the supplied plug-in connection with a pin bar.

9.2 Wall mounting

The VRC 400 weather compensator is designed so that it can be used as a remote-control control with or without room modulation. The controller must be installed to ensure that it can properly record the room temperature (away from heat traps, not mounted on cold walls etc.).

The best place of installation is mostly in the main living room on an inside wall at approx. 1.5 m height. There, the controller will be able to record the circulating

air, unhindered by furniture, curtains or other objects. In the room where the controller is installed, all radiator valves must be fully open when using room modulation.

The connection to the boiler is a 2-core bus cable (eBus), see fig. 10.1.

- Pull the weather compensator (1) out of the mounting box (5).
- Drill two holes (3) of 6 mm diameter (as shown in fig. 9.1) and put in the supplied wall plugs.
- Thread the connection cable through the duct (4).
- Fix the mounting box to the wall with the two screws provided.

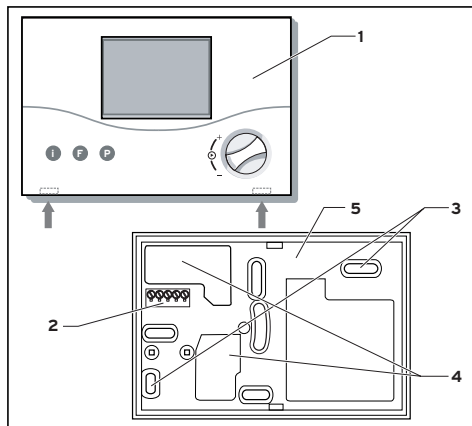


Fig 9.1 Mounting the controller

9 Installation

- Connect the lead as described in section 10.
- Place the weather compensator (1) on the mounting box (5) so that the pins on the back of the upper section fit into the recesses (2).
- Push the weather compensator onto the mounting box until it catches.

9.3 Installing the VRC 693 outdoor sensor

This equipment may only be opened by a qualified specialist and installed as shown in the diagram. Current safety regulations must be followed as well as the installation instructions for the heat-

ing equipment and for the heating controller.

Installation location

The outdoor sensor should be installed on the side of the house where the most frequented rooms are located. If this side can't be clearly identified, then install it on the north or north-west side of the house.

To ideally measure the outdoor temperature, for houses up to three storeys, the device should be fitted about two thirds of the way up the wall. For taller buildings, installation is recommended between the 2nd and 3rd floors.

The location should not be protected from the wind, nor particularly exposed and it should not be exposed to direct sunlight. The device must be at least 1 m away from any opening in the outer wall, from which warm air can either continuously or occasionally issue. It can be installed either in or on the wall, depending on the accessibility of the location.

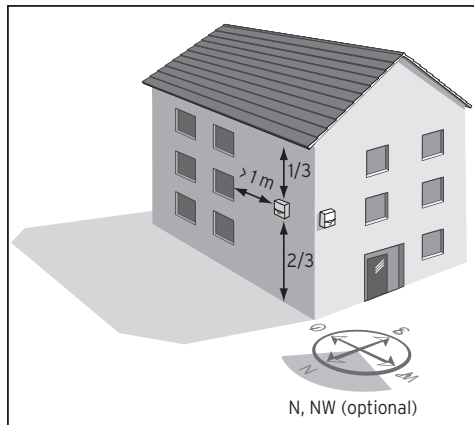


Fig. 9.2 Installation location of the VRC 693 outdoor sensor



Caution!

There is a risk of the wall and control becoming wet.

Lay the cables properly and carefully to ensure that the outdoor sensor and the building are not damaged by water.

The control must be fixed to the wall in the correct position, as shown in fig. 9.3.

The cable entry (3, fig. 9.3) must point downwards.

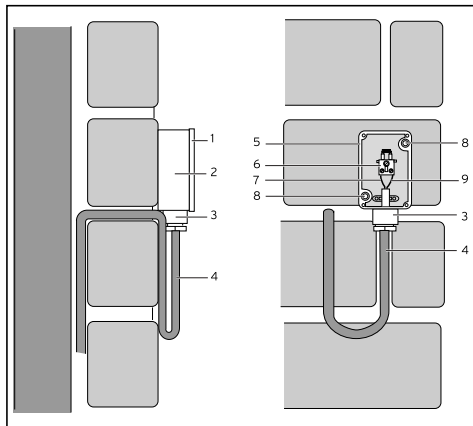


Fig. 9.3 Fitting and positioning the outdoor sensor

- Remove the cover (1) of the housing and fix the housing to the wall using two screws through the fixing holes (8).
- Lay a connection cable (4) of at least $2 \times 0.75 \text{ mm}^2$ and pull it up through the cable entry (3).
Lay the cable properly and carefully to ensure that the sensor and the wall are not damaged by water.
- Wire up the terminals as shown in the diagram in fig. 10.1.
- Make sure the housing seal is correctly fixed in the top section of the housing (1) and push the top section onto the housing.

- Fix the top of the housing (1) to the bottom (2) using the screws supplied.

10 Electrical installation

The electrical connection may only be carried out by a suitably qualified engineer.



Danger!

Risk of fatal electric shock from touching live connections. Before working on the control, turn off the power supply and secure against restart.

10 Electrical installation

10.1 Connecting the weather compensator

If the weather compensator is integrated directly in the boiler, the electrical connection is directly through the pin bars that are introduced in the connecting plug in the boiler.

For wall mounting, the communication to the boiler is through the eBus. All eBus-connectors are designed to take at least $2 \times 0.75 \text{ mm}^2$ (recommended) per terminal.

This means that the wires can be swapped without impairing communication (fig. 10.1).

Also follow the instructions for the boiler. Do not remove the jumper between terminals 3 and 4 on the boiler.

10.2 Connecting the outside sensor

The external probe is connected directly on the boiler. Please observe the boiler manual while connecting the control.

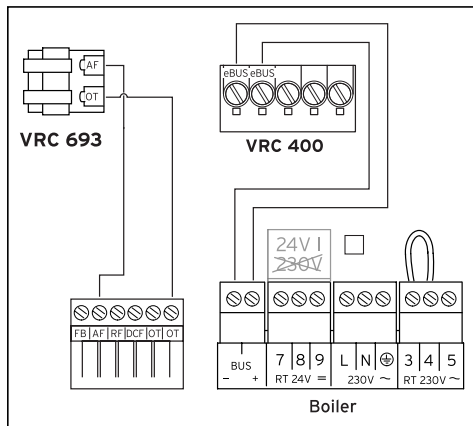


Fig. 10.1 Electrical connection

11 Start-up

Certain system parameters have to be set in order for them to best suit the actual conditions. These system parameters are all together in the intaller level and should only be set by the heating engineer.

The service/diagnostic level is also intended for the engineer and is designed to help during servicing.

11 Start-up

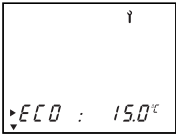
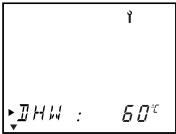
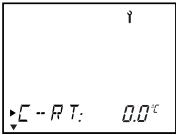
11.1 Installer level

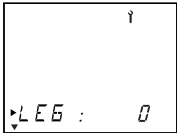
Press the P button to access the installer level.

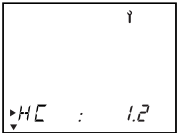
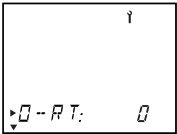
- Press the P button for 10 seconds. The spanner symbol and the first parameter appear in the display.
- Press the dial. You can select all the system parameters in turn.
- Turn the dial to set the values you want.

When you press the P button the display returns to basic mode.

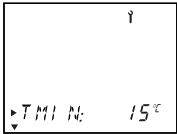
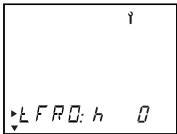
You can select and change the following parameters:

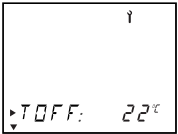
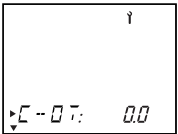
Display	Setting by turning the dial
	Set-back temperature Default setting: 15 °C Adjustment range: 5 ... 30 °C
	Set hot water temperature Default setting: 60 °C Adjustment range: 35 ... 70 °C
	Correction of actual room temperature Adjustment of the displayed value in the range of max. +/- 3 °C Factory setting 0 °C

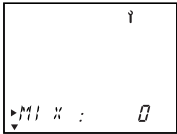
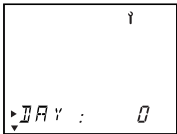
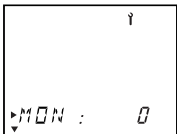
Display	Setting by turning the dial
	Anti-legionnaire's disease system 1=Activate the anti-legionnaire's disease function. Every Wednesday, one hour before the first time window, a connected hot water cylinder is heated to 70 °C, the circulation pump is switched on and operated at 70 °C for at least 30 minutes. Default setting = 0 (off)

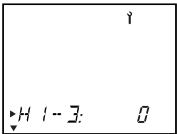
Display	Setting by turning the dial
	Heating curve The heating curve represents the ratio between outside temperature and target flow temperature. Default setting: 1,2
	Room temperature modulation (wall installation only) 1 = Room temperature modulation (including the room temperature in the flow temperature calculation) 2 = Thermostat function (switching off the heating when the set room temperature is reached) Default setting: 0 = No room modulation

11 Start-up

Display	Setting by turning the dial
	Minimum temperature (foot point) Adjustment range 15 ... 90 °C Default setting: 15 °C
	Frost protection delay Timed suppression of anti-frost function (activated at outside temperatures below 3 °C) Adjustment range: 0 ... 12 h Default setting: 0 h

Display	Setting by turning the dial
	Outside temperature shut-down threshold Shutdown temperature for demand-based deactivation of heating Adjustment range: 5 ... 50 °C Default setting: 22 °C
	Outside temperature correction Corrects the temperature currently measured by the set value to compensate for outside influences Adjustment range: -5 ... +5 °C Default setting: 0 °C

Display	Setting by turning the dial
	Hydraulic switch 1 = Activation of sensor recording when the hydraulic switch is used, default setting 0 = Off
	Day setting For activation of the calendar
	Month setting For activation of the calendar

Display	Setting by turning the dial
	Year setting For activation of the calendar
	Temperature level Activate the setting for different temperatures for each time window. 0 = Temperature level off 1 = Temperature level on, default setting: 0

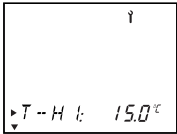
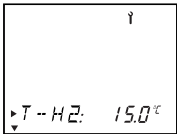
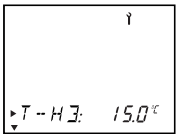
Display	Setting by turning the dial
	Temperature level time window H1 (only when temperature levels are activated)
	Temperature level time window H2 (only when temperature levels are activated)
	Temperature level time window H3 (only when temperature levels are activated)

Table 11.1 System parameters

11.2 Service/diagnostic level

Access the service/diagnostic level by pressing the P button and the dial.

- Press the P button and the dial simultaneously for 3 seconds.

First, a heating request for 50 °C is triggered to test communication with the boiler.

Then you can select all the test options by pressing the dial (see table 11.2). When you press the P button the display returns to basic mode.

You can select the following tests:

Dial	Test	Test procedure
Press and push P button for 3 seconds	Heating request	A heating request of 50 °C is simulated. The burner on the boiler starts up and the pump starts (only up to the maximum flow temperature of the boiler).
Turn	Hot water request	A hot water request is activated, charging pump starts working, all other elements are switched off.
Turn	Circulation pump	The circulation pump is activated (if connected). All other elements are switched off.
Press	Display test	All display elements are displayed.
Press	Software version	The software version is displayed.

Table 11.2

Restore default settings

- To restore the controller to its default condition, press the P button for 15 seconds.

As soon as the display lights up twice, the controller is completely reset to its default settings. This means that you will have to perform all individual settings again.

11.3 Handing over to the owner

The owner of the weather controller must be instructed about its functions and how to operate it.

- Hand over any instructions intended for the owner as well as the control documents.
- Go through the operating manual with the owner and answer any questions.
- Draw special attention to the safety instructions which the owner must follow.
- Tell the owner to keep the instruction manuals near the controller.

12 Technical data

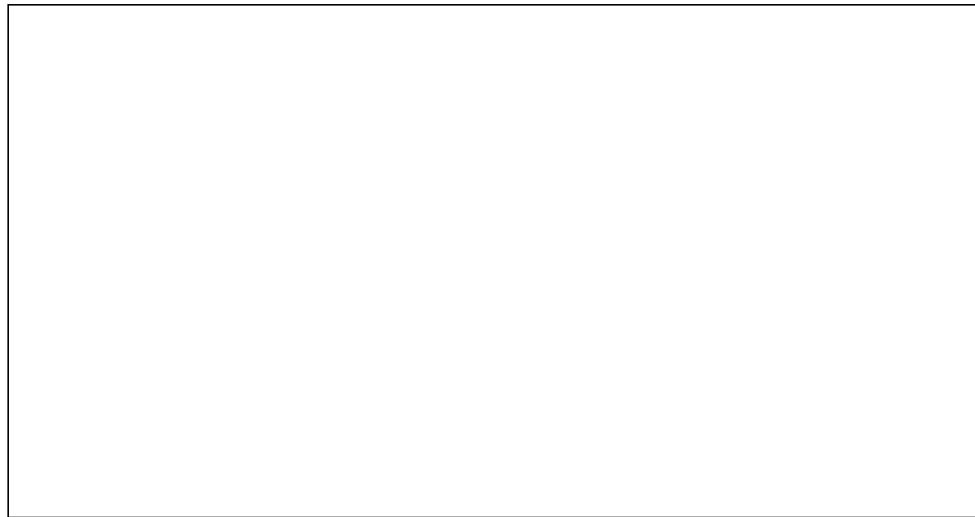
Description	Unit	
Operating voltage U _{max}	V	24
Maximum ambient temperature	°C	50
Current consumption	mA	< 17
Minimum cross-section of wires	mm ²	0.75
Level of protection		IP 20
Protection class		III
Dimensions		
Height	mm	97
Width	mm	146
Depth	mm	40

Table 12.1 Technical data

13 Vaillant customer service

To ensure regular servicing, it is strongly recommended that arrangements are made for a Maintenance Agreement. Please contact Vaillant service (0870 6060 777) for further details.

EC declaration of conformity



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